

# The Northwest Technology Transfer Center BULLETIN

Number 40

Fall 1993

A Newsletter of the Local Technical Assistance Program (LTAP)

## ***Books Change Lives***

*By George Crommes*

It seems that each day we notice an article or see a TV special on the lack of reading skills in America, especially of our youth. Obviously with the coming of television into our lives, people watch and observe others more and, hence, don't read as much as they did prior to television. When we read, our various senses are made active, more so than through TV. Our imagination, especially, is enhanced as well as our abilities to reason and think things out.

People in all careers, including you in public works, have a wealth of materials available that can help on your jobs and in your personal lives. The T<sup>2</sup> Center is one source of technical reading materials for those in public works. Many trade and association magazines and libraries (including WSDOT's free library services) are available.

A national reading promotional effort has been underway to remind Americans of the joy of reading and the importance of books in today's world. The Librarian of Congress, Dr. James Billington, chose "Books Change Lives" as the Library of Congress' national promotional theme for 1993-1994. The program is dedicated to Thomas Jefferson, the principal founder of the library, who stated succinctly, "I cannot live without books." Thomas Jefferson believed that education, liberty, and self-government are inseparable.

Dr. Billington adds, "Books are the individual's portable, affordable link with the memory, mind, and imagination of the rest of humanity. They link the record of yesterday with the possibilities of tomorrow."

Initiated by the Center for the Book in the Library of Congress, "Books Change Lives" is a unifying theme for organizing and supporting reading and literary projects that benefit all age groups. "Books Change Lives" is supported by educational and civic organizations, corporations, professional associations, labor unions, schools, libraries, and others who believe that books and reading are essential to wise government and individual well being. As noted by the symbology on this page, books give us wings.

In closing, reading materials are available on many subjects of interest to public works people whether they are laborers, lead technicians, superintendents, technicians, engineers, or public officials. WSDOT's library is available for loans as well as the NWT<sup>2</sup> Center for various materials. The T<sup>2</sup> "Bulletin" has listings of free publications and of references available through other sources. Another major source of contemporary reading materials are the trade magazines such as "Roads and Bridges," "Better Roads," "Engineering Newsweek," and "Pacific Builder and Engineer." Why not get some benefit from others' experiences documented in these magazines?

We all can gain by making an additional effort to read more and by promoting reading by others with whom we work. A wealth of information is literally available at our finger tips. What's stopping us from "having wings"?

BOOKS

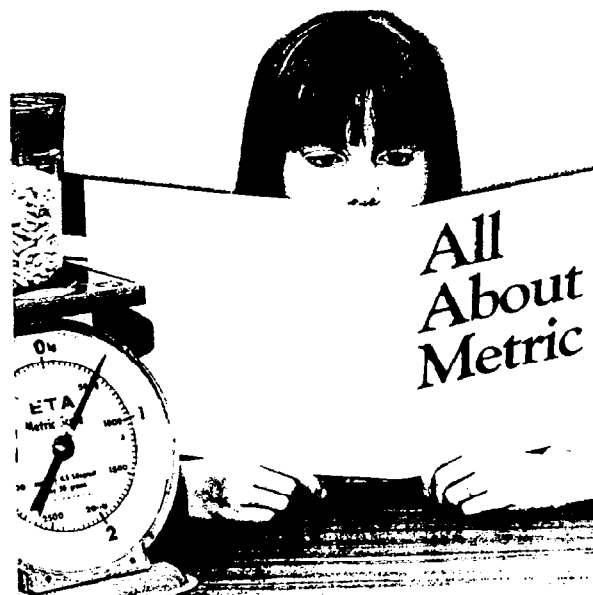
GIVE US

WINGS



## Rules for Writing Metric Symbols and Names

- Print unit symbols in upright type and in lower case except for liter (L) or unless the unit name is derived from a proper name.
- Print unit names in lower case, even those derived from a proper name.
- Print decimal prefixes in lower case for magnitudes  $10^3$  and lower (that is k, m, and n) and print the prefixes in upper case for magnitudes  $10^6$  and higher (that is, M and G).
- Leave a space between a numeral and a symbol (write 45 kg or 37 °C, not 45kg or 37°C or 37° C).
- Do not use a degree mark (°) with kelvin temperature (write K, not °K).
- Do not leave a space between a unit symbol and its decimal prefix (write kg, not k g).
- Do not use the plural of unit symbols (write 45 kg, not 45 kgs), but do use the plural of written names (several kilograms).
- For technical writing, use symbols in conjunction with numerals (the area is 10 m<sup>2</sup>); write out unit names if numerals are not used (carpet is measured in square meters). Numerals may be combined with written unit names in nontechnical writing (10 meters).
- Indicate the product of two or more units in symbolic form by using a dot positioned above the line (kg•m•s<sup>-2</sup>).
- Do not mix names and symbols (write N m or newton meter, not N meter or newton m).



## Rules for Writing Numbers

- Always use decimals.
- Use a zero before the decimal marker for values less than one (write 0.45 g, not .45g).
- Use spaces instead of commas to separate blocks of three digits for any number over four digits (write 45 138 kg or 0.004 46 kg or 4371 kg). Note that this does not apply to the expression of amounts of money. ■

(Adapted from "Oregon Roads," Spring 1993. Originally from Metric Guide for Federal Construction.)

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## T<sup>2</sup> Center for American Indians Set Up at EWU

As one of four new technology transfer centers set up for American Indians, the Center at Eastern Washington University will serve tribes in the northwest. Mr. Michael Marchand will manage the program. He can be reached at (509) 359-2290, or at:

Technology Transfer Center  
for American Indians  
Eastern Washington University Department of  
Urban and Regional Planning  
MS-50, Isle Hall  
Cheney, WA 99004

Legislated by the Intermodal Surface Transportation Efficiency Act (ISTEA), the Tribal Technical Assistance Program's purpose is to serve as a resource for transportation related items involving roads and bridges, economic development, recreation, travel, and tourism. Training and technical assistance will be provided. The goal of the program is to serve individual tribal needs. ■

# ***In the News***

## ***Campaign Launched Against Unfunded Mandates***

Four local government associations have launched a national campaign to make citizens aware of the cost of Congressional mandates to cities and counties facing tight budget restraints.

With many local governments operating with limits on property taxes, "every dollar that is spent on an unfunded mandate is one dollar less in our budgets that could be used to fight crime and drug abuse, improve education, provide health services, expand public housing, increase access to welfare, and enhance transportation services," said Barbara Todd, President of the National Association of Counties and County Commissioner for Penellas County, Florida.

Todd was joined by officials from the National League of Cities, the United States Conference of Mayors, and the International City/County Management Association at a press conference in Washington on August 12 to announce the new campaign.

Todd said that the goal of the organizations is not to oppose the goals of the mandates, but to require that the federal government not pass the entire cost of implementation to the local governments. ■

(Source: "AASHTO Journal," August 20, 1993)

## ***A New Sign Color for Pedestrian and Bicyclist Safety***

The National Safety Council estimates that 7,200 pedestrians and 1,000 bicyclists are killed annually in collisions with motorists. Nearly half of these deaths occur when pedestrians and bicyclists cross or enter streets.

The new color, fluorescent Strong Yellow Green (SYG), is highly visible and is believed to have a great potential for pedestrian and bicyclist safety. SYG has high conspicuity and is the most visible of the fluorescent colors in twilight and overcast conditions. Conspicuity is a measure of how well a sign is noticed by motorists. Therefore, improving motorists recognition of a crossing sign legend increases pedestrian and bicyclist safety.

Currently, 32 highway jurisdictions nationally are experimenting with fluorescent SYG warning signs. FHWA's report, "Guidelines for Evaluating Fluorescent Strong Yellow Green Crossing Signs," publication No. FHWA-SA-93-035 can be used for conducting before and after field evaluations of fluorescent SYG crossing signs.

Jurisdictions that want to participate in the evaluation study must obtain permission to experiment as outlined in Section 1A of the *Manual on Uniform Traffic Control Devices*. ■

(Source: FHWA "Transporter," June 1993)



# **Corporations Join Forces with University of Idaho's Scientists**

The Boeing Company has joined some of the most successful transportation and engineering companies in the United States as an industry partner in the University of Idaho's National Center for Advanced Transportation Technology (NCATT).

The Boeing Company, Morrison Knudsen Corp., EG&G Idaho Inc., and Baldor Electric Co. have recently joined forces with UI scientists to develop new transportation technologies. Membership in NCATT requires an annual contribution of \$25,000.

"The caliber of these partners sets a high standard for the future at NCATT," said UI engineer Dean Richard Jacobsen. "Their help in outlining the needs of industry will help guide the research efforts of our scientists and engineers."

NCATT Interim Director David Woodall agreed. "This partnership will provide industry a chance to test and demonstrate their new technologies and will provide ideas for research to meet the real needs of the transportation industry," he said.

Woodall noted the U.S. government requires transportation companies to use "proven technology" in the construction of high speed light rail systems, for example, yet that technology currently is available only from France, Germany, and Japan.

NCATT was created at the University of Idaho by the U.S. Congress as part of the Intermodal Surface Transportation Efficiency Act of 1991. Working closely with the industry partners, the center's staff is conducting research in critical technology areas including advanced materials, power electronics, alternative fuels, and computing and computer controls. Technology transfer and environmental issues are central to the center's mission.

More information about how to join the center as an industry partner is available by contacting Dr. Woodall at the UI College of Engineering, Moscow, Idaho 83843, phone (208) 885-6479. ■

*(Source: News Bureau, University of Idaho)*

## **Simple Solution for Repairing Guide Posts**

*By Michael J. Potter & Keith C. Russell*

Each winter season we are faced with the problem of numerous guide posts being cut off by over-zealous plow truck operators. Our concern is how to replace them when the ground is frozen. A solution to this dilemma came quite by accident.

A coworker and I were sent out to replace broken guide posts at a busy intersection on a cold, blustery day. Knowing the difficulties involved in this task, our equipment included a propane torch, as we felt that heating the ground around the posts might assist us in their removal. Instead, we found that passing the burning torch across the broken-off bottom mushroomed it out. By cutting the top section off completely, we

were then able to re-insert it 4 inches to 6 inches into the mushroomed portion. An easier fit can be attained by heating the portion to be inserted and rolling it on the ground surface until it has a slight taper. Once in place, we used snow in our gloved hands to cool and mold the joint back to a smooth finish.

The results of using this method surpassed our expectations. A post was saved for an alternate location, and the repair was permanent enough that no additional maintenance was required in the spring. ■

*(Source: "Transearch," T<sup>2</sup> Newsletter of Alberta Transportation and Utilities, August 1993)*

## **New Catalog Available from the ACPA**

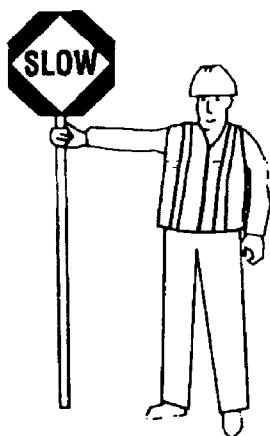
The American Concrete Pavement Association (ACPA) has published a new catalog — "the most complete and up-to-date source of information on concrete pavements available."

A 1993 organizational change merged the American Concrete Pavement Association with the Portland Cement Association's pavement division. The new catalog combines materials of both groups.

Publication categories include streets, airports, highways and roads, industrial parking lots, and rehabilitation and repair.

Within these categories are engineering bulletins, information sheets, pamphlets, promotional literature, special reports, and technical bulletins. Audiovisual materials such as slide sets, video cassettes, and computer programs are also available.

"The new catalog contains recommended materials for all those who need to know the why, where, when, and how to design, promote, and build the concrete pavements of today." To order, call ACPA at (708) 966-6288. ■



# ***Flagging Certification Availability***

In Washington, the flagging certification course is offered at community and technical colleges. For additional information, contact one of the following:

Bellingham Technical College, 3028 Lindbergh Ave., Bellingham, WA 98225. (206) 676-7759.  
Big Bend Community College, 766 Chanute St., Moses Lake, WA 98837. (509) 762-6260.  
Centralia College, 600 W. Locust St., Centralia, WA 98531. (206) 736-9391, ext. 403.  
Clark College, 1800 E. McLoughlin Blvd., Vancouver, WA 98663. (206) 699-0430.  
Clover Park Technical College, 4500 Steilacoom Blvd. SW, Tacoma, WA 98499. (206) 589-5671.  
Columbia Basin College, 2600 N. 20th, Pasco, WA 99302. (509) 547-0511, ext. 222.  
Everett Community College, 801 Wetmore Ave., Everett, WA 98201. (206) 388-9212.  
Grays Harbor College, Aberdeen, WA 98520. (206) 532-9020, ext. 262.  
Green River Community College, 12401 SE 320th St., Auburn, WA 98002. (206) 833-9111, ext. 309.  
Highline Community College, Federal Way Center, 31223-B Pacific Highway S., Federal Way, WA 98003. (206) 878-3710, ext. 570.  
Lower Columbia College, 1600 Maple, Longview, WA 98632. (206) 577-3426.  
North Seattle Community College, 9600 College Way, Seattle, WA 98103. (206) 527-3758.  
Olympic College, 1600 Chester Ave., Bremerton, WA 98310. (206) 478-4839.  
Peninsula College, 1502 E. Laundsen Blvd., Port Angeles, WA 98362. (206) 452-9277, ext. 220.  
Pierce College, 9401 Farwest Drive SW, Tacoma, WA 98498. (206) 964-8451.  
Seattle Central Community College, 1701 Broadway, Seattle, WA 98122. (206) 587-5482.  
Shoreline Community College, 16101 Greenwood Ave. N., Seattle, WA 98133. (206) 546-4561.  
Skagit Valley College, 2405 College Way, Mount Vernon, WA 98273. (206) 428-1133.  
South Puget Sound Community College, 2011 Mottman Road SW, Olympia, WA 98502. (206) 754-7711, ext. 207.  
South Seattle Community College, 6000 16th Ave. SW, Seattle, WA 98106. (206) 764-5339.  
Spokane Community College, North 2110 Fancher, Spokane, WA 99212. (509) 533-7179.  
Tacoma Community College, 5900 S. 12th, Tacoma, WA 98465. (206) 566-5019.  
Walla Walla Community College, 500 Tausick Way, Walla Walla, WA 99362. (509) 527-4330.  
Wenatchee Valley College, 1300 5th St., Wenatchee, WA 98801. (509) 662-1651.  
Whatcom Community College, 237 W. Kellogg Rd., Bellingham, WA 98226. (206) 676-2170.  
Yakima Valley College, PO Box 1647, Yakima, WA 98907. (509) 575-2915.

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## ***New Video Available on the Spirit Lake Memorial Highway***

An excellent video on the reconstruction of SR 504, the Spirit Lake Memorial Highway, is available for loan via the

T<sup>2</sup> Center. This 15-minute tape is available for loan through Laurel Gray at (206) 705-7386. Request tape number 270.

## PC-TRANS Updates Software Catalog

PC-TRANS announces the availability of its 1994 catalog of transportation-related software products. The catalog describes approximately 200 programs and related publications available through the PC-TRANS Software Distribution Service. The easy-to-use catalog is organized into 11 areas of application: environmental engineering, highway engineering, hydrology, management aids, mapping & GIS, structural engineering, surveying, traffic engineering, transit operations, transportation

planning and utilities, and miscellaneous. To further aid in locating programs, the catalog is also indexed by title.

Additions to the catalog are listed in each issue of "pc-trans" magazine. To request a free copy of the catalog (or a free subscription to "pc-trans" magazine), contact PC-TRANS at the University of Kansas Transportation Center, 2011 Learned Hall, Lawrence, KS 66045, (913) 864-5655; toll-free fax for orders or technical support only, (800) 245-8760. ■

## When You Don't Ask for Help

*(The following letter was written to an insurance company following the author's on-the-job accident. This letter has been widely circulated, so you may have seen it before. We would all do well to remember the importance of safety and sound judgment and to ask for help when we need it. The author of the letter is anonymous.)*

I am writing in response to your request for more information concerning Block #11 on the insurance form, which asks for "cause of injuries" and wherein I put "trying to do the job alone." You said you needed more information, so I trust the following will be sufficient.

I am a bricklayer by trade, and on the date of injuries I was working alone laying brick around the top of a four-story building when I realized that I had about 500 pounds of brick left over. Rather than carry the bricks down by hand, I decided to put them into a barrel and lower them by a pulley that was fastened to the top of the building. I secured the end of the rope at ground level and went up to the top of the building and loaded the bricks into the barrel and swung the barrel out with the bricks in it. I then went down and untied the rope, holding it securely to ensure the slow descent of the barrel.

As you will note on Block #6 of the insurance form, I weigh 145 pounds. Due to my shock at being jerked off the ground so swiftly, I lost my presence of mind and forgot to let go of the rope. Between the second and third floors I met the barrel coming down. This accounts for the bruises and lacerations on my upper body.

Regaining my presence of mind, I held tightly to the rope and proceeded rapidly up the side of the building, not stopping until my right hand was jammed in the pulley. This accounts for the broken thumb.

Despite the pain, I retained my presence of mind and held tightly to the rope. At approximately the same time, however, the barrel of bricks hit the ground and the bottom fell out of the

barrel. Devoid of the weight of the bricks, the barrel now weighed about 50 pounds. I again refer you to Block #6 and my weight.

As you would guess, I began a rapid descent. In the vicinity of the second floor I met the barrel coming up. This explains the injuries to my legs and lower body. Slowed only slightly, I continued my decent, landing on the pile of bricks. Fortunately, my back was only sprained, and the internal injuries were minimal.

I am sorry to report, however, that at this point I finally lost presence of mind and let go of the rope, and as you can imagine, the empty barrel crashed down on me.

I trust this answers your concern. Please know that I am finished trying to do the job alone. How about you? ■

*(Original Source Unknown)*

### Need to Know More?



**Make Use of  
WSDOT's Library  
A Free T<sup>2</sup> Resource**

**(206) 705-7750  
SCAN 705-7750**

## ***Launched Soil Nails***

The Forest Service and Soil Nailing Limited, with funding from the FHWA Coordinated Technology Implementation Program (CTIP), sponsored several demonstrations of soil nail launching technology in the western United States during the summer of 1992. The soil nail launcher is a device that shoots 1-inch and 1-inch diameter metal reinforcement nails or drain pipes into the ground. The nails are launched or shot into the ground to a depth of up to 20 feet using high pressure compressed air.

This technique is in contrast to conventional soil nails which are drilled into the ground using 6- to 8-inch diameter augers with the nail inserted and grouted in the hole. Typical drilling equipment requires a 15-foot wide bench below the soil nail location for operation.

The soil nail launcher mounts on a hydraulic hoe or other equipment to move the nail launcher into position. Depending on the length and reach of the boom, the hoe can be located 10 to 40 feet above or below the nail location. This capability makes the soil nail launcher ideal for pinning or nailing unstable roadway backslopes and embankment slopes with slip depths to 15 feet.

Launched soil nails are currently estimated to cost about \$130 per installed soil nail. On a 3-foot by 3-foot spacing, this is about \$14 per square foot of reinforced slope. This compares very well with retaining walls costing \$15 to \$60 per square foot of front face on low-volume roads.

For more information, contact John Mohney, U.S. Forest Service at (503) 326-2738. ■

*(Source: "Oregon Roads," Oregon T<sup>2</sup> Center, Spring 1993)*

## ***Recycling Around the World — The Netherlands Leads in D&C Waste Recycling***

The European Community (EC) is looking into the success of a public/private initiative in The Netherlands that has led to the recycling of nearly 75 percent of the demolition and construction (D&C) waste generated in the country. In 1980, The Netherlands imported all of its roadstone and landfilled its asphalt, rubble, and demolition waste. The only home-produced material used in road construction was blast furnace slag.

Ten years later, the situation has changed drastically thanks to a joint endeavor led by the government with the cooperation of the road-building industry. Stone imports have practically ended, asphalt rubble is recycled on-site back into new asphalt, and demolition waste is granulated and used for half the country's road bases. The incineration slag is used in embankments, and a search is now on for alternative materials to replace the gravel in concrete.

The European Demolition Association (EDA), which, appropriately enough, is headquartered in The Hague, has just published a nine-country European survey that confirms the Dutch lead in D&C waste recycling, but notes that local authorities in five countries now give recycling incentives. Countries where no incentives are provided have a very low recycling level. However, the five countries with recycling incentives expect increases from one-fourth to almost two-thirds by the end of the century in the amount of D&C debris reused rather than landfilled. In terms of actual numbers, Germany leads with 220 stationary D&C debris recycling plants, followed by The Netherlands and the U.K. Germany has also been named the lead country for a Europe-wide D&C waste recycling project under the EC aegis. ■

*(Source: "Virginia Eclectic," April 1993. Original source AASHTO's International Transportation Observer.)*

# Are You Willing to Do Whatever it Takes to Get the Job Done?

(The following is an article by Florida Department of Transportation Secretary Ben G. Watts.)

I had an interesting conversation with a friend not long ago about what we felt made some people successful while others, with as much talent, were less successful. My friend works in private business so it gave me an opportunity to get a point of view outside government.

Agreeing that while things such as intelligence, talent, ability, education, and training certainly were important, plenty of people who possess these are not successful. The one thing that tends to set some people apart is their willingness to do whatever it takes to get the job done. And before anyone asks, no, I don't mean doing anything illegal, immoral, or unethical. What I mean is being willing to work however hard, put forth however much effort, spend however much time, or devote however much thought it takes to solve the problem or complete the task at hand. Some people are willing, some are not.

The department is not that much different from private firms in this regard. We have some individuals who are, at best, only marginally willing to do the minimum their job requires; so does private industry. Industry is trying to change the attitudes of those nonperforming individuals or remove them from the system; so are we. The majority of our employees who come to work understand what is expected of them and do a good job in carrying their share of the load. This group is the backbone of any business — public or private. They don't always get paid as well as they should or receive as much recognition as they deserve, but they get the job done day in and day out. It is value received for value given — a day's work for a day's pay in its most positive and productive sense.

Finally, some individuals set themselves apart by their willingness to do whatever it takes to get the job done. If it takes more than 40 hours a week, they put in the time. If it means doing the unpleasant parts of the job as well as the "fun" parts, they tackle those parts head-on as well. It means picking up the slack for someone else, they do it generally without complaint until that particular job is finished. If they have a problem not easily solved, they stay with it until they find a solution. Those individuals make some mistakes as well, but when they make one, you know it will be a mistake made in trying to get the job done, not in failing to act.

I want to thank all of you in the latter two groups for all the hard work you do every day. I urge those in the first group to turn things around.

It can be done and, generally, it's not too late. You'll enjoy your work more and the public will certainly benefit also. ■

(Source: Edited by the Kentucky T<sup>2</sup> Center in the "Link," Summer 1993, from materials of the Florida T<sup>2</sup> Center.)





# Free Publications

*For Washington recipients only:  
Contact Laurel Gray at (206) 705-7386 or SCAN 705-7386 if you want publications.*

## **Local Low Volume Roads and Streets**

**November 1992**

This well organized manual provides local agencies with basic information on planning, design, construction, and maintenance of local low volume roads and streets. It is easy to use and specific topics may be quickly located. The publication was made possible by the joint efforts of ASCE, FHWA, and the USDA Forest Service. (80 copies available)

## **Scrap Tire Utilization Technologies**

**February 1993**

Currently an estimated 2 to 3 billion tires are stored in stockpiles throughout the United States. To assist you in assessing the available options and finding solutions, this brief report by the National Asphalt Pavement Association provides a comparison of the current uses of scrap tires. This report uses engineering feasibility and economic analysis to evaluate each technology and considers the potential environmental implications also. (75 copies available)

## **Roadside Improvements for Local Roads and Streets**

**October 1986**

This FHWA booklet is a simple general guide to effective, low cost methods of improving and enhancing roadside safety. By using any or all the improvements discussed, one can provide the driver with a better chance of recovering from an accident and/or reduce the potential severity of accidents along the edge of the highway. (50 copies available)

## **Improving Operational Safety on Local Roads and Streets**

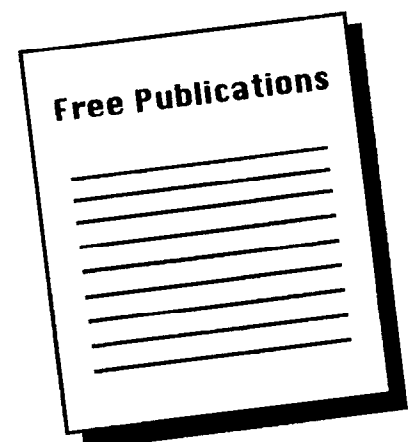
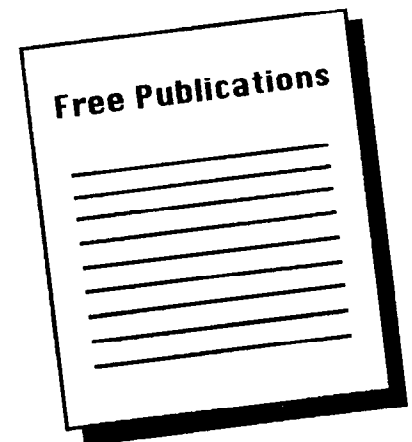
This FHWA booklet is a simple general guide to effective, low cost methods of improving and enhancing operational highway safety. Operational improvements provide the driver with the necessary and important information to control and maintain the vehicle on the roadway system. Operational improvements are often used to supplement or mitigate the effects of substandard roadway features by providing the driver with information on potential hazards ahead. (25 copies available) FHWA-RT-88-039

## **Guide to Safety Features for Local Roads and Streets**

This simple FHWA guide deals with the construction and maintenance practices that will lead to increased safety on local roads and streets. It provides local transportation agency personnel with important information related to highway safety features. The intended uses and functions for each of several features are discussed. Examples of both good and poor practices are given. This guide will be especially helpful to field personnel involved in construction, installation, and maintenance of safety related features on the highway system. (50 copies available) FHWA-RT-88-027

## **Fish Passage Through Culverts**

This booklet was prepared by the United States Department of Agriculture — Forest Service to provide a set of guidelines for the design and rehabilitation of culverts which allow fish passage. Working as a team, hydrologists, fish biologists, and civil engineers can design, construct, and maintain an acceptable structure with fish passage capabilities. The very vivid principles and criteria can be adapted to the design of any drainage structure. (50 copies available) FHWA-FL-90-006



# Educational Opportunities

*The purpose of this column is to inform you of the numerous educational opportunities that exist for our Washington State and adjacent states' transportation people. We also place this information on our electronic bulletin board. To obtain a brochure of details on the workshops listed, please contact Laurel Gray at the Northwest T<sup>2</sup> Center (206) 705-7386.*

## **Northwest Technology Transfer Center --- (206) 705-7390**

The T<sup>2</sup> Center offers or supports numerous workshops of interest to public works agencies in Washington. Announcements are advertised in the newsletter, the *Bulletin*, and flyers are sent out to public works agencies requesting their interests prior to the workshops.

- ❑ **T<sup>2</sup> Centers "Road Shows."** Began September 1993. Contact Wil Garner 705-7385.

## **County Road Administration Board (CRAB) (206) 753-5989**

If there is a special class you would like to see developed for counties, contact CRAB.

## **TRANSPPEED (Transportation Partnership in Engineering Education Development) ----- (206) 543-5539**

- ❑ **Basics of Traffic Engineering.** December 1-2, 1993, Vancouver, WA. Cost \$120-\$300.
- ❑ **Roadway Geometric Design.** October 27-29, 1993; December 8-10, 1993, Tacoma, WA. Cost \$120-\$300.
- ❑ **Safety Through Maintenance and Construction Zones.** November 4-5, 1993, Tacoma, WA. Cost \$120-\$300.

## **Battelle ----- 1-800-426-6762**

Registrations for workshops are taken on first come, first serve basis. Call Battelle for additional information.

- ❑ **Managing Software Products.** December 8-9, 1993, Seattle. Cost \$885.
- ❑ **Effective Program Management.** December 9-10, 1993, Portland, OR. Cost \$885.
- ❑ **The Engineer as Manager.** November 4-5, 1993, Seattle. Cost \$885.

## **ASCE ----- 1-800-548-2723**

- ❑ **Municipal Solid Waste Landfills and Ground-Water Quality Protection.** November 15-16, 1993, Wyndam Garden Hotel, Seattle, WA. Cost \$645 for members, \$745 for nonmembers.
- ❑ **Receiving Water Impacts.** January 10-12, 1994, Seattle. Cost \$745 for members, \$845 for nonmembers.

## **Pacific Lutheran University ----- (206) 535-7330**

- ❑ **Supervisory Survival Skills.** March 16-17, 1994, PLU University Center, Tacoma, WA. Cost \$495.
- ❑ **Breakthroughs in Fleet Management.** December 13-14, 1993, Seattle Airport Hilton. Cost \$745.

## **WSDOT ----- (206) 705-7495**

- ❑ **Free Workshop on Integrating Transportation Design and Environmental Permit Process.** October 25, 1993, Yakima Holiday Inn, Yakima, WA; October 27, Spokane Ridpath Hotel, Spokane, WA; October 29, 1993, Vancouver Red Lion Hotel, Vancouver, WA; November 1, Sea Tac Holiday Inn, Sea Tac, WA; November 2, 1993, Everett West Coast Hotel, Everett, WA; November 5, 1993, Tumwater Tyee Hotel, Tumwater, WA. Sponsored by the Environmental and Transportation Resources Task Force. Hosted by WSDOT. Contact Judy Stratton (206) 705-7495.

## **Professional Engineering Practice Liaison Program (PEPL), University of Washington College of Engineering ----- (206) 543-5539**

(All classes are at the University of Washington unless otherwise noted.)

- ❑ **Effective Public Works Construction Contracts.** November 19, 1993. Cost \$165.
- ❑ **Managing People (Including Yourself) for Project Success.** October 4, 1993 - February 28, 1994. Cost \$595.
- ❑ **Site Monitoring, Characterization, and Remediation for Underground Storage Tank Installations.** December 2-3, 1993. Cost \$365.
- ❑ **Fundamentals of Geosynthetics Engineering.** November 4-6, 1993. Cost \$455.
- ❑ **Advanced Topics in Geosynthetics Engineering.** November 8-9, 1993. Cost \$365.
- ❑ **Seismic Design of Structures I: Dynamic Analysis and Lateral Load Determination.** October 19, 21, 26, and 28; November 2, 4, 9, 16, 18, and 23, 1993. Cost \$425.
- ❑ **Construction Site Erosion and Sediment Control Inspector Training Program.** October 20, 21, 27, and 28, 1993. Cost \$495.
- ❑ **Bioremediation Technology for Hazardous Wastes.** October 25-26, 1993. Cost \$350.
- ❑ **Biofiltration for Stormwater Quality Enhancement.** November 17, 1993. Cost \$180.
- ❑ **NPDES Permit Issues Workshop.** December 8, 1993. Cost \$165.

## **National Businesswomen's Leadership Association ----- 1-800-258-7246**

- ❑ **How to Manage Conflict and Maintain Emotional Control.** October 22, 1993, Seattle, WA; October 25, 1993, Pasco, WA; October 27, 1993, Spokane, WA; November 1, 1993, Yakima, WA; November 2, 1993, Bellevue, WA; November 3, 1993, Olympia, WA; November 4, 1993, Vancouver, WA; November 5, 1993, Wenatchee, WA; November 15, 1993, Everett, WA; November 16, 1993, Tacoma, WA. Cost \$49.

# Educational Opportunities (Contd.)

## Fred Pryor Seminars ----- 1-800-255-6139

- ❑ **Management Problems of the Technical Person in a Leadership Role.** November 1, 1993, Olympia, WA; November 2, 1993, Tacoma, WA; November 3, 1993, Everett, WA; November 4, 1993, Seattle, WA; November 16, 1993, Spokane, WA. Cost \$199.

## National Seminars Group

- ❑ **Total Quality Management: A Step-by-Step Guide to Making TQM Work for You.** October 18, 1993, Yakima, WA; October 19, 1993, Olympia, WA. Cost \$149.

## APWA — BC Chapter

- ❑ **Productivity Improvement for Public Works Supervisors.** October 28-29, Vancouver, B.C. Fee \$245 US/\$319 CAN for members. Contact (816) 472-6100, Ext. 511 or 512.

## KEYE ----- 1-800-821-3919

- ❑ **The Americans with Disabilities Act: Responding to the New Law.** October 27, 1993, Portland, OR; October 28, 1993, Seattle, WA. Cost \$125.

## Oregon T<sup>2</sup> Center ----- (503) 378-3421

- ❑ **Seismic Design of Highway Bridges, NHI 13048.** October 18-22, Portland, OR. Fee \$155.

## Washington State University Conferences

## and Institutes ----- (206) 840-4575

- ❑ **Telecommunications Infrastructure Planning.** February 9-11, 1994, Seattle, WA. Cost \$995 for members, \$1,095 for nonmembers.
- ❑ **The TQM Facilitator Skills Training Course.** December 13-15, Red Lion Inn, Sea-Tac, WA. Cost \$895.

# Conferences and Meetings

- ❑ **Building a Pedestrian Program.** October 21, 1993, Bellevue, WA. Contact Jan Klippert (206) 296-6510.
- ❑ **Northwest Pavement Managers' Conference.** October 26-28, 1993, Everett Pacific Hotel, Everett, WA.
- ❑ **31st Annual Road and Street Maintenance Supervisors' School — Westside.** November 3-5, 1993, Everett Pacific Hotel, Everett, WA.
- ❑ **APWA — OR & WA and T<sup>2</sup> Centers WA & OR. Computer-Aided Public Works Conference.** November 8-10, 1993, Skamania Lodge, Steveson, WA. Contact Events Solution (503) 928-5055.
- ❑ **WSAC Legislative Conference.** November 17-19, 1993, Red Lion at the Quay, Vancouver, WA.
- ❑ **United States Hot Mix Asphalt Conference.** November 17-19, 1993, Atlanta, GA.
- ❑ **World of Concrete Trade Show.** January 4-8, 1994, New Orleans, LA. Contact ACPA 1-800-323-3550, ext. 219.
- ❑ **1994 International Road Federation Conference.** July 2-4, 1994, Calgary, Alberta, Canada.

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# The BULLETIN

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